Supporting Low-Temperature Enhanced-Efficiency Combustion of Jet Propellants with Convergent Soliton Waves for Reduced Exhaust IR Signatures

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Simon Edwards
Research Acceleration Initiative

Introduction

Soliton waves, which have a wide variety of applications ranging from propulsion to aircraft and submarine detection to mineral exploration to Reactive Structural Reinforcement to propulsion to physics-enhanced chemistry has yet another potential application in the area of IR signature reduction in cases where one wishes to reduce the temperature of jet exhaust.

Abstract

While there are a number of methods available for blocking or redirecting IR light and a recent publication by this author proposes a method for preventing the initial emission of IR light from a heated metallic body, those solutions do not address the issue of jet exhaust temperature. While photo-magnetic propulsion is expected to render jet propulsion obsolete, to the extent that jet propulsion may continue to be utilized (perhaps in short and long-range missiles) and to the extent that propulsion of enhanced efficiency is desired, one might wish to augment combustion chambers of this type with inwardly-oriented soliton waves. Previous publications from early 2023 describe how soliton waves can be used to both combat wildfires and to enhance the yield of conventional explosives. More recent publications describe how molecular structures may be dissolved without thermal or chemical catalysts using soliton waves.

In the publication of 10 January 2024, it is explained how the thermal output of an exothermic reaction (combustion) is 50% attributable to the separation of hydrogen from a hydrocarbon and 50% attributable to its unification with an oxidizer. Both the process of separation and the process of unification consist of a great many small motions toward and away from the molecule from which a separation it occurring or to which a conjunction is occurring, respectively. This wobble is the natural consequence of chance combinations of discrete magnetic moments of electrons in hydrogen and in the carbon or oxygen either attracting or repelling the electron of hydrogen. Eventually, the attractive force of the greater number of valence electrons in the oxidizer wins out, locking the hydrogen into a strong bond with the oxidizer. If this separation and conjunction process (sc. combustion) could be made to be smooth rather than consisting of this (heretofore unconfirmed) series of forward and reverse movements, the combustive process would made made to be less exothermic and simultaneously more volatile.

Soliton waves; which are capable both of breaking molecular bonds and of altering the position and magnetic orientation of individual electrons during their

passage through materials; are the logical choice for bringing about such an altered form of combustion.

A traditional jet combustion propulsion system could be augmented with a system which directs soliton waves from multiple directions toward the combusting hydrocarbon fuel. These waves could be predicted to accelerate the breaking of chemical bonds between carbon and hydrogen and to accelerate the bonding of liberated hydrogen with oxygen. The net result would be mitigated (substantially) heat generation with enhanced pressure generation and therefore enhanced propulsive force. In fact, this effect may be so great that entirely new engine systems would need to be designed in order to prevent catastrophic damage to any engine utilizing this enhanced hydrocarbon combustion process.

Remarkably, missiles propelled by this sort of combustion would have a minimal infrared signature as each individual combustion event would produce virtually no heat. The soliton waves would act as a sort of lubricant for the process of separation and conjunction of atoms with respect to the formation of whole molecules. Waves of intensities sufficient to separate hydrogen from carbon but not sufficiently strong so as to be capable of separating hydrogen from oxygen (as this would prevent conjunction of hydrogen with oxygen,) would be ideal for supporting such an application.

The absence of heating of the gas produced should actually mitigate the amount of thrust generated as less heat should mean, ultimately, less pressure in the traditional mode of operation of jet propulsion. However, not all of the volumetric expansion of combustive materials during a combustive process are attributable to increases in temperature. In a cold combustive process calibrated with sufficient precision, a combusting mixture of hydrocarbons and oxidizer could be made to expand to sufficient effective volume to generate thrust if a chain reaction were sufficiently rapid. Rather than this expansion being driven by increases in thermal energy, it would necessarily be driven by a series of coordinated shockwaves in which hydrogen molecules colliding with oxygen molecules generate linear motion of the combustive body as a whole which is eventually exerted against the thrust actuator. In this respect, the mode of function would be similar to that of a Pulse Detonation Engine (PDE) but with substantially greater efficiency and substantially decreased stress on engine components with a substantially reduced infrared signature versus that generated by a traditional PDE.

Conclusion

Although PoMP-propelled military aircraft will revolutionize warfare, high-speed projectiles powered by enhanced-efficiency engines without identifiable infrared signatures will similarly act as a force multiplier in the near to medium-term future.